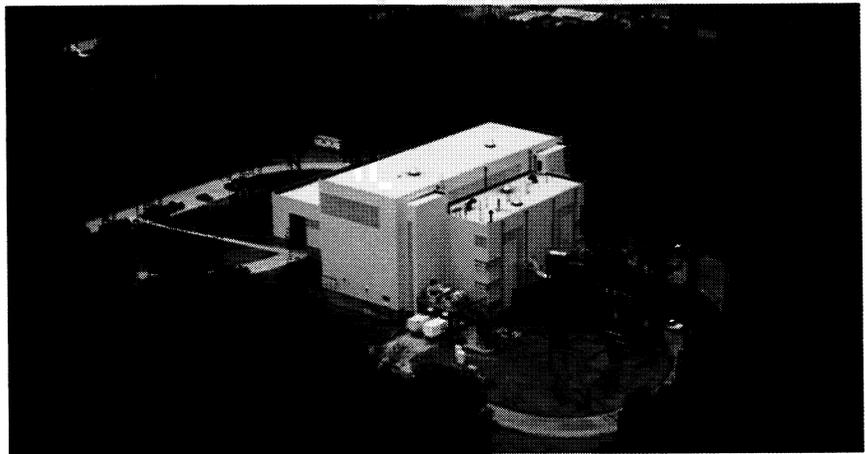

Profit from a Problem

A trash-fueled energy production facility exemplifies a special area of NASA effort—service to communities by demonstrations of advantageous technology

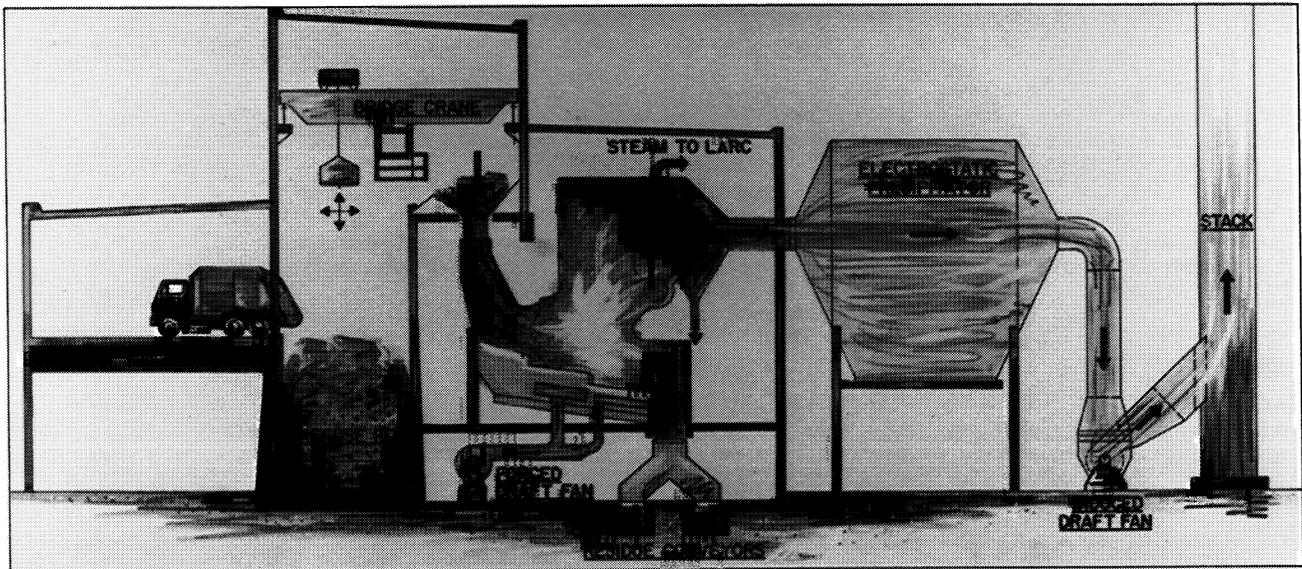
Late last year, a new facility at Langley Research Center began operational service. It is not a facility for advanced space research, nor a wind tunnel for probing the frontiers of atmospheric flight. It is simply a trash-burning steam plant—but, like Langley's more exotic work, it represents a pioneering effort. It provides a design base for modeling similar projects elsewhere, to the benefit of national energy conservation, and it also solves a local environmental problem.

The problem—shared by a growing number of communities—was how to dispose of refuse in a Virginia coastal area where acceptable landfill sites are scarce. The solution—the Refuse-fired Steam Generating Facility—not only meets disposal needs, it offers a bonus by using trash instead of oil as fuel for energy production.

Before the facility went into service, Langley Research Center and adjacent Langley Air Force Base



At Langley Research Center, the facility shown at top burns refuse to generate steam. At right, solid waste is crane-lifted into an incinerating system. The next steps are shown in the diagram on the opposite page; the electrostatic precipitator cleans combustion gases before they are expelled through the stack.



used a landfill on government property. But the low elevation of the land and the possibility of subsurface water contamination made it extremely difficult to meet Environmental Protection Agency regulations, and there was no other suitable land for disposal operations. The nearby city of Hampton faced similar problems; its own landfill, daily receiving solid waste from a population of 140,000, was expected to be filled by the early 1990s.

Jointly sponsored by Hampton, NASA-Langley and Langley Air Force Base, the Refuse-fired Steam Generating Facility disposes of all solid waste from the NASA center, the Air Force base, the Army's Fort Monroe and other federal installations in the area; it also accommodates about 70 percent of Hampton's municipal waste. The incinerated refuse is reduced to a readily-disposable ash whose volume is only one-seventh that of the solid waste brought to the plant. The energy produced in the burning process is converted to steam for use in research and administrative facilities at Langley Research Center. The system offers these advantages:

- The need for federal landfill operations is eliminated.
- Waste dumped in the city's landfill is reduced by about 70 percent, extending the landfill's useful life to 33-40 years.

- The amount of fuel oil normally used by Langley Research Center to generate steam for its facilities is cut by more than two million gallons a year.
- Combined costs of refuse disposal and steam production are lower.

Langley Research Center supervised design and construction of the facility, assisted by prime contractor J. M. Kenith Company, Atlanta, Georgia and the architectural engineering firm Wiley and Wilson, Lynchburg, Virginia. Through a bond issue, the City of Hampton financed approximately 70 percent of the cost; NASA-Langley and Langley Air Force Base provided the remainder.

Built on government land, the plant remains NASA's property, but Hampton will operate it for at least 20 years under a lease arrangement. The city will realize revenue from refuse disposal fees paid by all of the organizations involved and from sale of steam to NASA-Langley. The revenue will cover the facility's operating expenses and additionally allow payoff of the city bonds over the 20-year period.

The process of producing steam from refuse is relatively simple. Trucks haul in about 200 tons of solid waste daily and dump it in a refuse pit. The waste is then crane-lifted, dropped through a chute into a dual furnace/boiler system and incinerated. The resulting ash drops

out of the boilers onto conveyors, is picked up by trucks and transported to the Hampton landfill. The gases created by the burning process are cleaned by a precipitator system before they are expelled into the atmosphere.

The high-intensity heat—about 1800 degrees Fahrenheit—generated by burning waste is used to convert water flowing through the walls of the twin boilers into steam. The plant is expected to produce some 300 million pounds of steam annually, about 85 percent of Langley Research Center's needs.

This project is an example of NASA's community service effort, in which the agency provides technological assistance—to communities, state and local governments, medical institutions and other organizations—with the aim of broadening technology awareness. In this instance, the technology was largely "off-the-shelf" and NASA's contribution consisted of technical and management expertise. In other cases, NASA demonstrates use of advanced technology to solve major problems or to provide better ways of meeting public needs. In this special area of technology transfer, some product spinoff may evolve from the technology applied, but product commercialization is not the primary aim; the intent is to pave the way for community-sponsored application of beneficial technology.